

WHAT IS CLAIMED IS:

1. An apparatus for applying at least one first layer of a first application medium and at least one second layer of a second application medium to a material web, each of the first application medium and the second application medium being one of a liquid medium and a pasty medium, the material web having a web surface, the at least one first layer and the at least one second layer being first applied onto a moving base, the moving base being the web surface in the case of direct application thereof, the moving base being a transfer element in the case of indirect application thereof, the transfer element being configured for transferring each said at least one first layer and each said at least one second layer applied thereon to the web surface of the material web, said apparatus comprising:

a first curtain applicator unit including a first discharge nozzle, said first curtain applicator unit configured for discharging the first application medium through said first discharge nozzle in a form of a first curtain onto the moving base, the first curtain moving substantially under the force of gravity; and

a second curtain applicator unit including a second discharge nozzle, said second curtain applicator unit configured for discharging the second application medium through said second discharge nozzle in a form of a second curtain onto the moving base, the a second curtain moving substantially under the force of gravity, said first applicator unit being positioned relative to said second applicator unit such that a spacing of about 100 mm to about 500 mm separates the first curtain and the second curtain.

2. The apparatus of claim 1, wherein the first application medium has a first water retention capacity, the second application medium having a second water retention capacity, the first water retention capacity being lower than the second water retention capacity.

3. The apparatus of claim 1, wherein the first application medium has a first density, the second application medium having a second density, the first density being at least about 10% greater than the second density.

4. The apparatus of claim 1, wherein the first application medium has a first viscosity, the second application medium having a second viscosity, the first viscosity being greater than the second viscosity.

5. The apparatus of claim 1, wherein at least one of the first application medium and the second application medium is one of an aqueous solution and an aqueous dispersion of solid particles.

6. The apparatus of claim 5, wherein said at least one of the first application medium and the second application medium is one of an acrylate dispersion and a butadiene-styrene dispersion.

7. The apparatus of claim 5, wherein the solid particles are one of mineral pigments and microscopic plastic particles.

8. The apparatus of claim 5, wherein the solid particles are one of plastic pigments, ink-filled microcapsules and starch.

9. The apparatus of claim 1, wherein at least one of the first application medium and the second application medium has a solids content in an approximate range of 5% by weight to 70% by weight.

10. The apparatus of claim 1, wherein at least one of the first application medium and the second application medium has a Brookfield viscosity determined at 100 rev/min of between about 10 mPas and about 2000 mPas.

11. The apparatus of claim 1, wherein the first application medium is used for forming a barrier layer, the first application medium having at least one of the following properties:

a solids content in an approximate range of 2% by weight to 30% by weight;

a Brookfield viscosity determined at 100 rev/min of between about 10 mPas and about

5 150 mPas; and

a density of between about 0.8 g/cm³ and about 1.1 g/cm³.

12. The apparatus of claim 11, wherein the first application medium is a starch solution.

13. The apparatus of claim 1, wherein said first curtain applicator unit is configured for applying an amount of the first application medium applied to the moving base, said amount being between about 2 ml/m² and about 20 ml/m².

14. The apparatus of claim 1, wherein the second application medium is a dispersion of ink-filled microcapsules, each of the microcapsules having a microcapsule diameter associated therewith, the second application medium having at least one of the following properties:

each of the microcapsules having a microcapsule diameter of between about 5 µm and

5 about 12 µm;

a solids content of between about 20% by weight and about 50% by weight; and

a Brookfield viscosity determined at 100 rev/min of between about 100 mPas and about 400 mPas.

15. The apparatus of claim 1, wherein said second curtain applicator unit is configured for applying an amount of the second application medium applied to the moving base, said amount being between about 5 ml/m² and about 30 ml/m².

16. The apparatus of claim 1, wherein at least one of said first curtain applicator unit and said second curtain applicator unit is configured for applying the first application medium and the second application medium, respectively, to the moving base in a substantially finally metered manner.

17. The apparatus of claim 1, further comprising a pressure-differential device for producing one of a vacuum and a positive pressure, said pressure-differential device being operatively positioned between said first curtain applicator unit and said second curtain applicator unit.

18. The apparatus of claim 1, wherein each of the first curtain and the second curtain has a curtain flow path and a curtain width associated therewith, the apparatus further comprising at least one guide element, each said guide element being arranged within said curtain flow path of one of the first curtain and the second curtain, each said guide element configured for guiding the one of the first curtain and the second curtain along at least a part of the curtain flow path and substantially over the curtain width associated therewith.

19. The apparatus of claim 1, wherein each of the first curtain and the second curtain has a curtain height of between about 40 mm and about 400 mm.

20. The apparatus of claim 1, wherein said first curtain applicator unit and said second curtain applicator unit are configured for discharging the first application medium and the second application medium, respectively, onto the moving base at a rate of between about 4 l/min and about 100 l/min per meter of working width.

21. The apparatus of claim 1, wherein the moving base has a base running speed associated therewith, the base running speed being up to 3000 m/min in the case of coating graphic papers, the base running speed being at least 200 m/min in the case of coating cardboard.

22. The apparatus of claim 1, wherein said first curtain applicator unit and said second curtain applicator unit are together configured for producing a grammage of coated material web between about 30 g/m² and about 150 g/m² in the case of coating graphic papers and between about 150 g/m² and 1000 g/m² in the case of coating cardboard.

23. The apparatus of claim 1, wherein the apparatus is configured for processing a material web that is one of a paper web, a cardboard web, a film web and a textile web.

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